Linear and Non-Linear Genetic Algorithms for Solving Problems such as Optimization, Function Finding, Planning and Logic Synthesis

Abstract

The present invention is a mixed (linear and non-linear) genetic algorithm capable of learning and inventing. An initial population of linear chromosomes (linear entities) composed of genes containing the functions and arguments to a problem, is created and expressed as non-linear entities called expression trees. The non-linear entities are then executed, producing results. Then the results are assigned values and the respective individuals (linear entities and respective non-linear entities) are selected to reproduce according to these values. During reproduction, the linear entity or chromosome is subjected to one or several operators, namely, mutation, one-point recombination, two-point recombination, transposition, insertion and gene transposition. This way, new individuals are created which are in their turn executed, initializing a new cycle which is repeated as many times as necessary to discover a solution to the problem.